

they touch the platform walls next to the slots. This is overcome by using the cross member 17. The bending is minimized when 25x1mm knife is used. The serrations in the knife edge and the quality of the edge sharpness also reduce the loads of cutting which in turn reduce the bending of the knives on load.

#### DEVICE B. MULTI KNIFE CUTTING DEVICE – INCLINED CUTTING ACTION.

##### Construction details.

The general appearance of the device is shown in Figs 7 and 8. It differs from Device A in knife assembly, lever design and cutting action. Here the knife assembly moves in an arc with the hinge pin as the center of the circle. The feature of the platform with slots is common. The hinge mechanism ensures that the individual knives match with the slots in the platform. This device is simpler than device A and access to platform is better. The safety features are better in device A because of coil springs supporting the knife frame.

The major components are

	<u>PART NOS</u>
Knife assembly cum lever	1,2,3,4,16
Hinge mechanism	5,9
Platform	6,14
Board	10,11

The board 10 ( 20x80x290 mm ) is made of wood or plastic. On it are mounted the platform part 6, the stopper part 11, and the two angle supports 9 for the hinge mechanism. The platform 6 ( 32 x92x 120 mm) is made of wood or plastic and is fitted on the board with locating pins 8 mm dia at location marked 14 in fig 9. The platform has 7 nos 4 mm wide and 20 mm deep slots which match with the location and center to center distance of the 7 knives in the knife assembly. The stopper 11 (14x50x80 mm) is screwed to the board 12. The angles 9 (25x40x2 mm) are made of stainless steel and fixed to the board by screws shown at location 13, figs 7 and 8. The angle is cut at the board top level on the 80mm side. This is to facilitate the knife frame to be tilted back for rest position after the cutting stroke. The knives part 3 are 0.6mm thick, 16mm wide, 152mm long with two holes of 4.2mm dia on either side as shown in fig 8. They are made of grade 420 stainless steel with serrated edges. Seven of these knives are assembled in slots 0.7mm wide, 26mm deep at 9mm center to center distance in part nos 1&2 which are knife supports and also act as a lever along with part 16 which is made of stainless steel flat 3x16mm. Part 1 dimensions are 16x 72x64mm and part 2, 16x72x38 mm and they are made of either wood or plastic. Two nos 4mm bolts part 4 are used in part 1 to assemble the

knives with the frame as shown in fig 7 and 8. Two nos stainless steel supports part 8 ( 3x28x52) made of 3mm sheet are embedded in part nos 1 and 2 (fig 8 ). These are required to attach the U-frame part 15, fig 10. The U frame is made by bending to shape stainless steel sheet 2x52mm. Height of the leg of part 15 is 60mm and the open end free dimension is 174mm resulting from the spring back of the pressing operation. When part 15 is pressed between the two supports part 8 and 4mm bolts fitted in location 12 as shown in fig 8, the dimension becomes 164mm. This increases the rigidity of the frame and also imparts tension to the knives

Part 2 of knife assembly has two 4.2mm dia holes through which pass 4mm bolts, connecting the knives to the frame. Out of these two bolts part 5 is longer and acts as a hinge bolt connecting the knife assembly to the vertical angles. This forms the hinge mechanism and has the required washers between the angles and part 2 to prevent excessive play. The second bolt is shorter and is recessed into the frame part 2. The knife cross member part 7 is made of wood (32x32x80mm). It has 7 slots at 9mm centers (fig 9 ). Each slot is 1mm wide, 16mm deep with tapered edges in the bottom for easy sliding on to the knife assembly during the cutting operation.

#### Functional description

The cutting operation is described below. Raise the knife assembly and lean back on the board at the hinge end in vertical position. Place the vegetables to be cut on the platform 6 with the length of the vegetable across the knives covering not more than 70 percent of the area in a single layer. Hold the knife assembly at the edge lever part 16 away from the knives and bring it down close to the vegetables and slide part 7 on to the center of the knives. Now push the knife assembly firmly over the vegetables and into the platform slots till it comes to rest on part 11. The knives do not touch the bottom of the slots as they are 2mm deeper than the knife bottom edge.

With this the knives cut the vegetables, the pieces are pushed out of the spaces between the knives on to the platform and the cross member 7 also comes out. The cut pieces can be collected in a tray (not shown) kept below the device by tilting the device or they can be pushed into the tray by a spatula. The device is ready for the next cycle of cutting. One cutting cycle takes less than a minute, cutting for example six beans into pieces in a single cut. This makes the device highly productive.

For cutting finger chips the potato is to be cut first into slices in the traditional way. The device can cut each slice into 8 strips in one cutting stroke. This device makes finger chip cutting easy and fast.